SKF Static Motor Analyzer Baker AWA-IV

Introduction

Baker AWA-IV static motor analyzers are the go-to instruments for motor repair, reliability and maintenance professionals who need to understand the electrical condition of motors their organizations depend upon. Weak motor insulation often degrades to the point of causing premature and unexpected motor failure, which in turn can result in costly unplanned downtime of production machinery. The Baker AWA-IV is a fully-automated motor analyzer that automatically performs repeatable, user-programmable tests to thoroughly assess the strength of a motor's insulation and circuit. It is also used to assure quality of motor rebuilds or new production motors before they are placed into service.

The Baker AWA-IV is a simple-to-use instrument with an intuitive, touch-screen user interface. It delivers accurate, repeatable results regardless of the skill level of a given operator. It easily detects problems that low-voltage testers cannot find by performing a comprehensive set of both high- and low-voltage tests. Results are presented in simple, easy-to-understand graphs and reports that give motor maintenance professionals the information they need to minimize costs and unplanned downtime.

Improve test reliability

The Baker AWA-IV is a Windows 7-based instrument that can be programmed to perform a specific set of tests on a given motor. Unique user-programmed attributes can be saved for future use over the life of the same motor, including:

- tests and sequences that are performed
- voltage to test to
- pass/fail criteria
- motor nameplate information

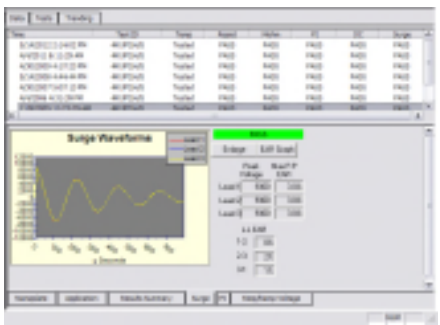
This programmed repeatability ensures the same tests are conducted in the same order on a specific motor; i.e., tests that can occur weeks, months or even years after the tests were initially programmed and performed. Moreover, the same tests can be conducted exactly as programmed regardless of who uses the analyzer on subsequent tests. An operator merely needs to select the motor from the analyzer's database, make the appropriate connections, then press the test button to perform tests. Any variation in results would be accurate and not prone to operator error or variables with how each of the tests were previously performed.

Testing a stock motor with a Baker AWA-IV for quality assurance before placement in service

When tests are completed, the analyzer automatically indicates which tests have passed or failed. Graphical information and analysis for each motor is stored and can be reviewed on the analyzer's LCD screen to identify trends that may indicate potential problems. No analysis on the part of the user needs to occur in the field; data can also be saved to a server or PC database for later retrieval on a desktop or laptop computer.

Wide range of analyzer models and features

The Baker AWA-IV family includes models designed to perform tests at maximum voltages from 2 000 on up to 12 000 volts. Models include 2 kV, 4 kV, 6 kV, 12 kV and 12 kV HO (high output). The 2 kV and 4 kV models have a smaller case than 6 kV and 12 kV models (see specifications for each model on the back page for dimensions and weight). These analyzers can be coupled with SKF static motor analyzer power packs to boost test voltages to 24 or 30 kV for tests on large motors.



Baker AWA-IV screen with surge test results

Baker AWA-IV series analyzers perform the following tests:

- resistance
- meg-Ohm
- surge
- DC continuous ramped
- step-voltage
- polarization index (PI)
- dielectric analysis (DA)
- DC hipot

Rigorous but safe testing

The Baker AWA-IV offers the most advanced inter-turn test capabilities offered with a portable electric motor analyzer. The surge test safely applies voltages that a motor typically experiences hundreds of times over its working life, such as the voltage spikes that occur each time a motor is powered on for use. The Baker AWA-IV's step-voltage test can also be applied time after time with no adverse impact on a motor.

The Baker AWA-IV's computer control and waveform monitoring also provide major advantages over other motor testing devices on the market. The small number of pulses applied by the Baker AWA-IV during a test are digitized to produce a waveform that can be compared to previous pulse waveforms for detection of insulation weakness among winding turns. A pulse-to-pulse EAR (error-area ratio) calculation is applied to compare waveform differences not easily detected by the naked eye; this PP-EAR is sensitive to less than a percent of variance between waveforms. Shorts among parallel windings, which are often very difficult to identify with visual inspections of the waveforms, are also easy to detect thanks to the calculations performed by this PC-based analyzer.

After tests are completed and no turn-to-turn weaknesses are detected, the final pulse waveform data is stored for future reference and comparisons to other phases. This waveform can serve as the motor's unique reference waveform for several years (until it is rebuilt or decomissioned).

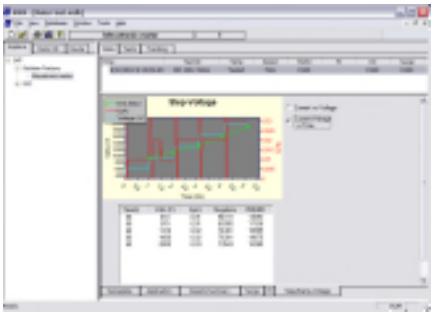
Test Date	5/14/2012	4/4/2011	4/30/2009	5/14/2008	4/30/2007
Test Time	2:14:02 PM	8:11:29 AM	4:17:23 PM	4:44:44 PM	5:07:13 PM
Temp Status	Tested	Tested	Tested	Tested	Tested
Temp(°C)	22.3	19.3	20.9	22.3 RH 53%	20.9 RH 70%
Resist Status	PASS	PASS	PASS	PASS	PASS
Bal L1 (Ohms)					
Bal L2 (Ohms)					
Bal L3 (Ohms)					
L1-L2 (Ohms)	1.348	1.177	1.356	1.348 Corr: 1.362	1.356 Corr: 1.377
L2-L3 (Ohms)	1.36	1.176	1.37	1.36 Corr: 1.37	1.37 Corr: 1.39
L3-L1 (Ohms)	1.350	1.175	1.36	1.350 Corr: 1.364	1.36 Corr: 1.38
Max Delta R %	0.890	0.170	1.030	0.890	1.030
Coil 1 (Ohms)	0.669	0.588	0.673	0.669 Corr: 0.676	0.673 Corr: 0.684
Coil 2 (Ohms)	0.68	0.589	0.68	0.68 Corr: 0.69	0.68 Corr: 0.69
Coil 3 (Ohms)	0.681	0.587	0.69	0.681 Corr: 0.688	0.69 Corr: 0.70
Megohm Status	PASS	PASS	PASS	PASS	PASS
Volts (V)	2500	2520	2500	2500	2500
I(µA)	0.25	0.80	0.22	0.25	0.22
Resist	10042	3150	11325	10042	11325
At 40°C	2951	749	3011	2951	3011
PI Status	PASS	PASS	PASS	PASS	PASS
Volts (V)	2520	2520	2500	2520	2500
DA Ratio	2.2	4.6	2.1	2.2	2.1
PI Ratio	2.8	6.7	2.4	2.8	2.4
DC Status	PASS	PASS	PASS	PASS	PASS
Test Type	HiPot	HiPot	HiPot	Step-Voltage	Step-Voltage
Volts (V)	10500	10500	10500	10500	10500
I(µA)	1.40	2.30	1.50	1.40	1.50
Resist	7500	4565	7000	7500	7000
At 40°C	2204	1085	1861	2204	1861
Surge Status	PASS	PASS	PASS	PASS	PASS
Peak Volt(V) L1	9360	9360	9360	9360	9360
Peak Volt(V) L2	9360	9360	9360	9360	9360
Peak Volt(V) L3	9360	9360	9360	9360	9360
Max P-P EAR(%)	No Test	No Test	No Test	3.0/3.0/3.0	3.0/3.0/3.0
EAR 1-2/2-3/3-1(%)	No Test	No Test	No Test	1/1/0	1/1/0

Comprehensive test results summary screen

Test data collection, storage and reporting capabilities

All test results can be saved and stored on the Baker AWA-IV, but they can also be backed up or copied to a server or a desktop PC. The analyzer can connect by wire or wirelessly to a local-area network (LAN) to store test results in a relational database (e.g., Microsoft Access). Once stored, results are easy to retrieve and generate reports to share with colleagues and customers. Test results can be presented in context with historical data to identify and monitor trends with a given motor's condition.

Printed motor test reports are valuable for maintenance recordkeeping, to provide customer warranty information, or to manage insurance records. The Baker AWA-IV's Windows 7 operating system enables a wide selection of compatible plug-and-play USB printer options.



Step-voltage test results screen

Baker AWA-IV test ID selection screen

Large motor test capabilities

Increase the test capability of the Baker AWA-IV by coupling with an SKF power pack. The Baker PP24, Baker PP30 and Baker PP85 power packs are high-voltage test generators that enable testing of high-voltage windings. The output voltage is controlled by a variable transformer that produces up to 30 000 volts. Power packs perform both surge and DC hipot tests when used with a Baker AWA-IV as the control, recorder and display unit.

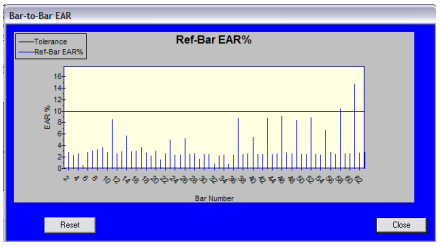
The Baker AWA-IV coupled with a Baker PP30 power pack unit enables testing on high-voltage motors and generators

The Baker ZTX accessory (at right) works with Baker AWA-IV analyzers to enable tests on low-impedance DC motor components

Low-impedance testing

Bar-to-bar armature tests on low-impedance coils are possible with the use of the Baker ZTX bar-to-bar test accessory or Baker PP85 power pack. The Baker ZTX accessory reduces the voltage applied while increasing current to enable accurate tests on DC motor armatures as well as other low-impedance windings.

The ATF 5000, a hand-held device that comes with the Baker ZTX , improves the speed, accuracy and ease of testing armatures bar-to-bar.



The bar-to-bar test results screen on a Baker AWA-IV static motor analyzer

Baker AWA-IV features

- Megohm, PI, DA, DC step-voltage, DC hipot test capabilities
- USB port for data transfer and printing with Windows 7 plug-and-play printers
- Wireless networking capability
- RJ-45 ethernet plug for hard-wire local-area network connections
- 12 kV HO (high-output) versions for performing surge tests on large motors
- Power pack compatibility (6 kV, 12 kV, and 12 kV HO versions only)
- Solid-state disk drives standard
- Windows 7 Embedded operating system
- IEEE- and IEC-compliant surge test

Service

SKF Condition Monitoring provides world-class global technical support for its motor test and monitoring equipment. Whether it is for routine calibration, or repairs and upgrades for static or dynamic analyzers, our experienced technicians will return your equipment in top condition with fast turn-around and courteous service.

Contact SKF's motor test and monitoring product service at +1 800-523-7514 (in the U.S.), or +1 858-496-3627 from outside the U.S., or email our service department at service.cmcfc@skf.com.

Training

Want to get the most out of your investment in your SKF analyzer? SKF Electric Motor Condition Monitoring provides training on dynamic motor test and monitoring methods at its training center in Fort Collins, Colorado, USA, or at customer locations around the globe. Training courses include introductory and advanced seminars on static motor testing that allow you to get the most out of your Baker AWA-IV.

For more information, or for reservations, send an email to sales.cmcfc@skf.com, or call 970-282-1200.

Product Support Plans

Maximize your Baker AWA-IV analyzer's uptime and performance over the life of the product with SKF Product Support Plans (PSPs). These plans assure worry-free use and maintenance of your SKF electric motor analyzer. For more information about PSPs for electric motor test equipment, contact your local SKF sales representative.

For customers in the United States, call 970-282-1200; for global contacts, visit SKF's electric motor test and monitoring solutions website at

http:// www.skfusa.com/electricmotortesting

to find a country representative, or send an email inquiry to sales.cmcfc@skf.com.

	Baker AWA-IV/12 HO	Baker AWA-IV/12	Baker AWA-IV/6	Baker AWA-IV/4	Baker AWA-IV/2
Surge test					
Output voltage Max output current	0 to 12 000 V 800 A	0 to 12 000 V 600 A	0 to 6 000 V 250 A	0 to 4 000 V 450 A	0 to 2 000 V 250 A
Pulse energy	7,2 J	2,88 J	0,72 J	0,9 J	0,2 J
Storage capacitance	0,1 µF	0,04 µF	0,04 µF	0,1 µF	0,1 µF
Sweep range	2,5 to 200 µs/Div	2,5 to 200 µs/Div	2,5 to 200 µs/Div	2,5 to 200 µs/Div	2,5 to 200 µs/Div
Volts division	250/500/1 000/2 000	250/500/1 000/2 000	250/500/1 000/2 000	250/500/1 000/2 000	250/500/1 000
Repetition rate	5 Hz	5 Hz	5 Hz	5 Hz	5 Hz
Voltage measurement and accuracy	± 12 % [1]	± 12 % [1]	± 12 % [1]	± 12 % [1]	± 12 % [1]
DC Hipot test					
Output voltage Max output current	0 to 12 000 V 10 000 µA	0 to 12 000 V 5 000 µA	0 to 6 000 V 5 000 µA	0 to 4 000 V 5 000 µA	0 to 2 000 V 10 000 µA
Current resolution	0,1, 1, 10, 100 µA/Div	0,1, 1, 10, 100 µA/Div	0,1, 1, 10, 100 µA/Div	0,1, 1, 10, 100 µA/Div	0,1, 1, 10, 100 µA/Div
Over-current trip settings (factor @ 0,8)	1, 10, 100, 1 000 µA	1, 10, 100, 1 000 µA	1, 10, 100, 1 000 µA	1, 10, 100, 1 000 µA	1, 10, 100, 1 000 µA
Full scale voltage and current measurement and accuracy	± 5 %	± 5 %	± 5 %	± 5 %	± 5 %
MΩ accuracy	± 10 %	± 10 %	± 10 %	±10 %	± 10 %
Max MΩ reading	>50 000 MΩ	>50 000 MΩ	>50 000 MΩ	>50 000 MΩ	>50 000 MΩ
Resistance measurements	0,001 to 800 Ω	0,001 to 800 Ω	0,001 to 800 Ω	0,001 to 100 Ω	0,001 to 100 Ω
Physical characteristics					
Weight kg *(lb)*	22,7 kg *(50 lb)*	19 kg *(42 lb)*	19 kg *(42 lb)*	8,2 kg *(18 lb)*	8,2 kg *(18 lb)*
Dimensions, cm *(inches)*	(40,6 x 20,3 x 53,3 *(16 x 8 x 21)*	40,6 x 20,3 x 53,3 *(16 x 8 x 21)*	(40,6 x 20,3 x 53,3 *(16 x 8 x 21)*	38,1 x 20,3 x 20,3 *(15 x 8 x 8)*	38,1 x 20,3 x 20,3 *(15 x 8 x 8)*
Power requirements	85 to 264 V AC 50/60 Hz at 2,5 A	85 to 264 V AC 50/60 Hz at 2,5 A	85 to 264 V AC 50/60 Hz at 2,5 A	85 to 264 V AC 50/60 Hz at 2,5 A	85 to 264 V AC 50/60 Hz at 2,5 A

[1] Note: surge voltage accuracy meets and is based upon the Z540 standard at four times measurement uncertainty (calibrated within three percent).

What's in the box

- Power cord
- USB flash drive with desktop software
- User manual (on USB flash drive)
- Test leads
- Keyboard with integrated mouse

Optional accessories

- Baker PP24, Baker PP30, Baker PP85
- Baker ZTX low-impedance test accessory
- USB plug-and-play printer
- USB wireless network adapter

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PUB CM/P2 14773 EN · June 2014